

GRADE CONTROL SYSTEM

Trimble TV
GPS Machine Control Done by MCS

Overview

- How to use the Trimble SiteVision Office
- How to load design data to GCS900
- End-State!
 - To be able to integrate your approved design data with heavy equipment earthwork.

Objectives

- **TLO**

- Given a survey set general purpose (GP), completed horizontal construction design, data transfer device, corresponding heavy equipment and references, prepare the Grade Control System (GCS) to integrate design data into GCS to guide construction quality control. (1361-SRVY-2006)

Objectives

● **ELO**

- 1. Given a survey set general purpose (GP), completed horizontal construction design, data transfer device, and references, import file to grade control software per the Trimble# 43422-10-ENG. (1361-SRVY-2006a)
- 2. Given a survey set general purpose (GP), completed horizontal construction design, data transfer device, and references, process digital terrain model in grade control software per the Trimble# 43422-10-ENG. (1361-SRVY-2006b)
- 3. Given a survey set general purpose (GP), completed horizontal construction design, data transfer device, and references, upload file into data transfer device per the Trimble# 43422-10-ENG. (1361-SRVY-2006c)

Objectives

● ELO

- 4. Given a survey set general purpose (GP), completed horizontal construction design, data transfer device, corresponding heavy equipment and references, establish communication between base station and heavy equipment per the Trimble# 5900-06-ENG. (1361-SRVY-2006d)
- 5. Given a survey set general purpose (GP), completed horizontal construction design, data transfer device, corresponding heavy equipment and references, conduct blade calibration per the Trimble# 5900-06-ENG. (1361-SRVY-2006e)

Media

- Lecture Method
- Demonstration
- Practical Application
- Trimble Tutorial

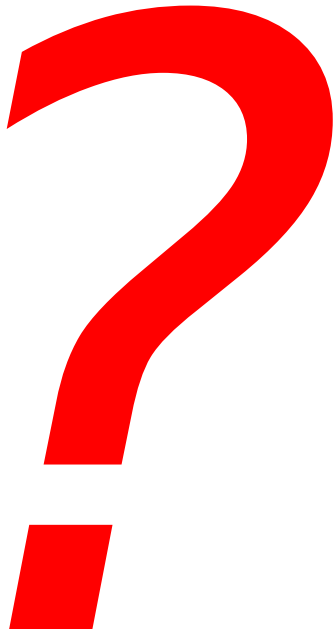
Evaluation

- Performance exam

Safety/Cease Training

- Fire
- Tornado
- Safety is paramount

Questions



Office

- Who uses the Trimble Site Vision Office?
- What Site Vision Office is used for?

Introduction

- An easy to use data management tool for the Trimble GCS900 Machine Control System
- Designed for the site data manager and engineer
- Developed for use on all machine types
- Simple and efficient transferring and checking design data

SVO Introduction, Cont.

- Ideal software to:
 - Manage data, designs, sub-designs and data card content
 - Log all data transactions
 - Provide a complete record of design usage
 - Ensure operators have correct information to maximize productivity

SVO, Uses

- Earthwork contractors and civil engineers can:
 - Import designs from other CAD packages and translate them into the SireVision format
 - Run validation checks
 - View any profile and check spot heights for inconsistencies for more confidence in the data
 - Break verified data into smaller subsets to copy to data cards for use on machines with GCS900 installed

SVO, 3D Design Simulation

- Makes it simple to visually verify the data before you leave the office
- As you drive a virtual machine over the design, the SiteVision Office screens display the same view it does in the machine on the job site



Data Transfer/Import/Export

- Its easy to transfer data from CAD and design software packages
- Transfer data from most major CAD/desging software such as
 - Terramodel, Paydirt Sitework, AutoCAD, GEOPAK, and Insite
- Imports a wide range of data formats
- Exports Site Vision Office format from other leading design packages

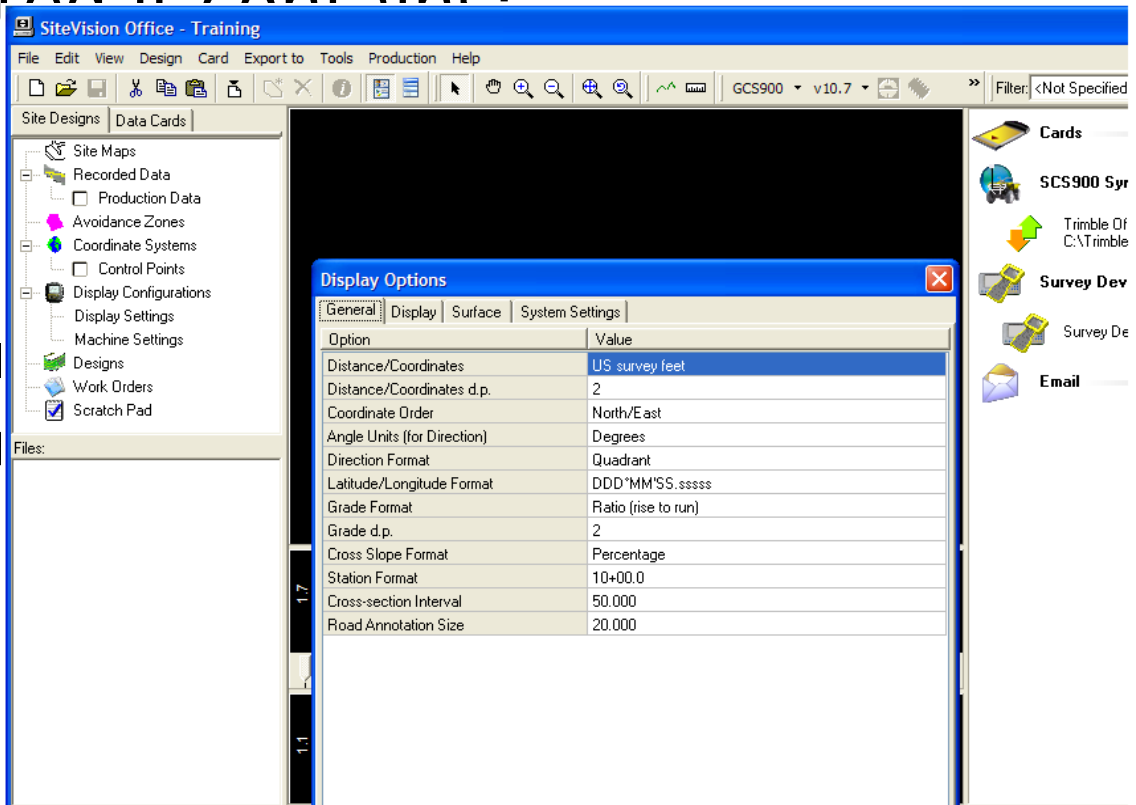
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- Who uses SVO?
- What other software is SVO compatible with?

Site

- SiteVision Office organizes data into sites. When a new site is created it contains:

- Site maps
- Recorded terrain
- Avoidance zones
- Coordinate system
- Display configuration
- Designs
- Work orders



How to Create a New Site

- Start SiteVision Office
- Select new site icon on tool bar
- Create a new site
 - The Display Options dialogue will appear



- When a new site is created it what does the Site Design Tab contain?

Options

- This is where you customize how a site looks in SiteVision Office
 - General Tab
 - Display Tab
 - Surface Tab
 - System Settings Tab

Options

- Is where you set the units and establish the look and feel for the site
- When a new site is created the display options dialogue box appears. It has four tabs:
 - General
 - Display
 - Surface
 - Systems settings

Display Options, cont.

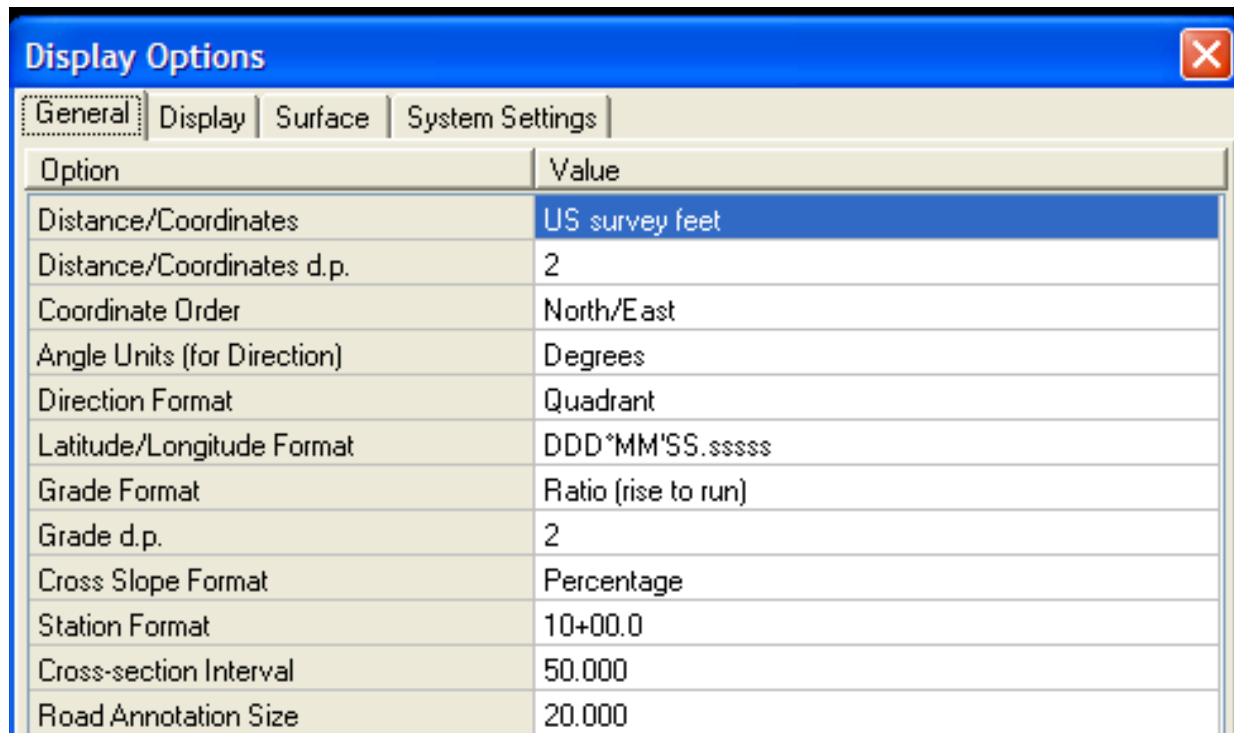
- When finished with the Display Options, press the OK button. To return to the display options in the future to make changes once the site is already started:
 - Select the Tools pull down menu
 - Select Display Options

General Tab

- Contains:
 - Distance and Coordinates Units
 - Coordinate Order
 - Angle Units
 - Direction Format
 - Grade Format
 - Station Format

cont.

- To change and value within the general tab:
 - Select the value
 - Select from the list of options

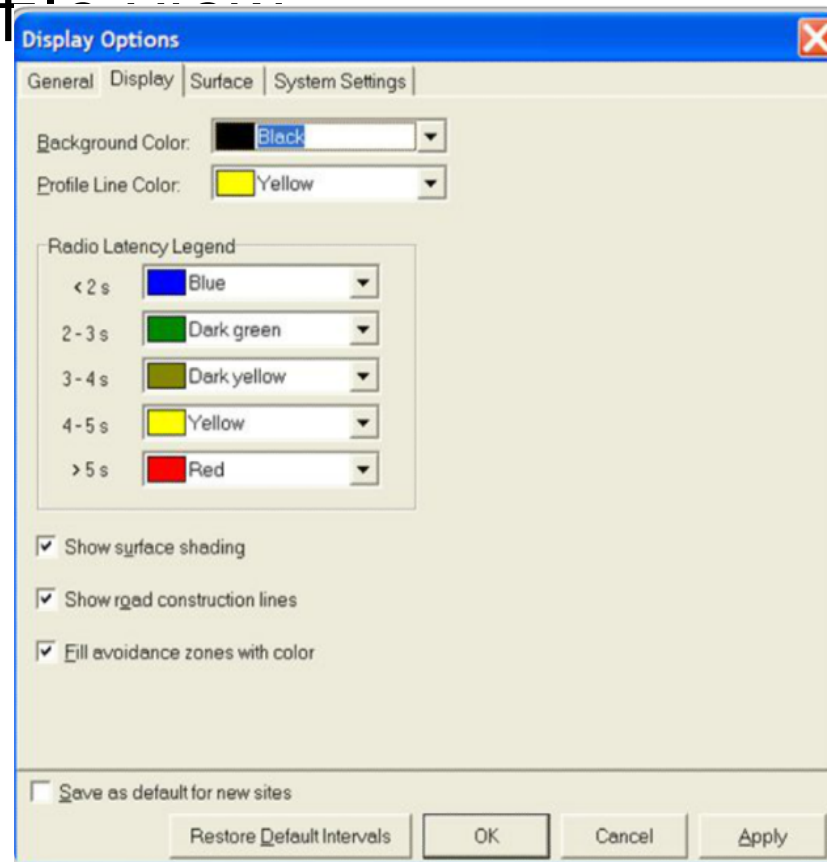


The screenshot shows a software dialog box titled "Display Options" with a standard Windows-style title bar (blue with a close button). Below the title bar are four tabs: "General", "Display", "Surface", and "System Settings". The "General" tab is selected. The main area of the dialog is a table with two columns: "Option" and "Value". The table lists various display settings, and the first row, "Distance/Coordinates", is highlighted in blue.

Option	Value
Distance/Coordinates	US survey feet
Distance/Coordinates d.p.	2
Coordinate Order	North/East
Angle Units (for Direction)	Degrees
Direction Format	Quadrant
Latitude/Longitude Format	DDD°MM'SS.sssss
Grade Format	Ratio (rise to run)
Grade d.p.	2
Cross Slope Format	Percentage
Station Format	10+00.0
Cross-section Interval	50.000
Road Annotation Size	20.000

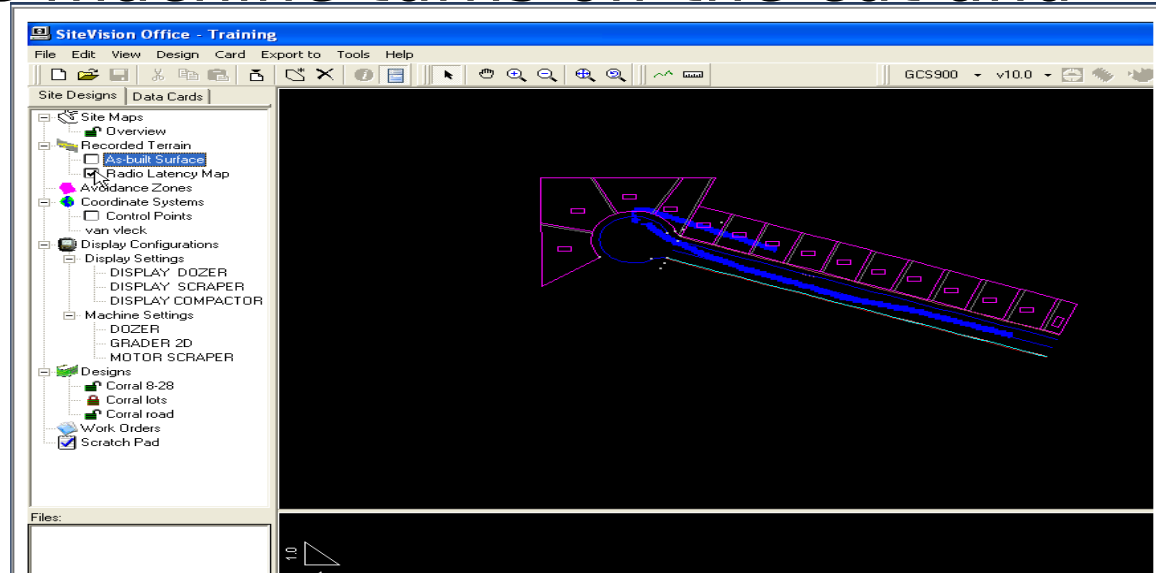
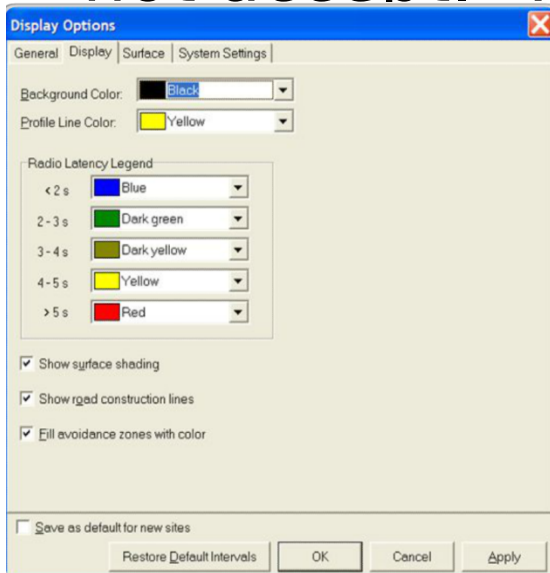
Display Tab

- Set the background and profile line colors for the Plan view, Cross-section view, and the Profile view.



Set the radio latency legend

- The radio latency legend is set for blue for all positions that are within 2 seconds. Data messages transmitted from the base station to the machine arrives within 2 seconds. Anything more than 2 seconds the GCS900 will not accept. The machine turns off the cut and



Select the options to:

- Show surface shading for all designs
- Show road construction lines
- Fill the avoidance zones with color

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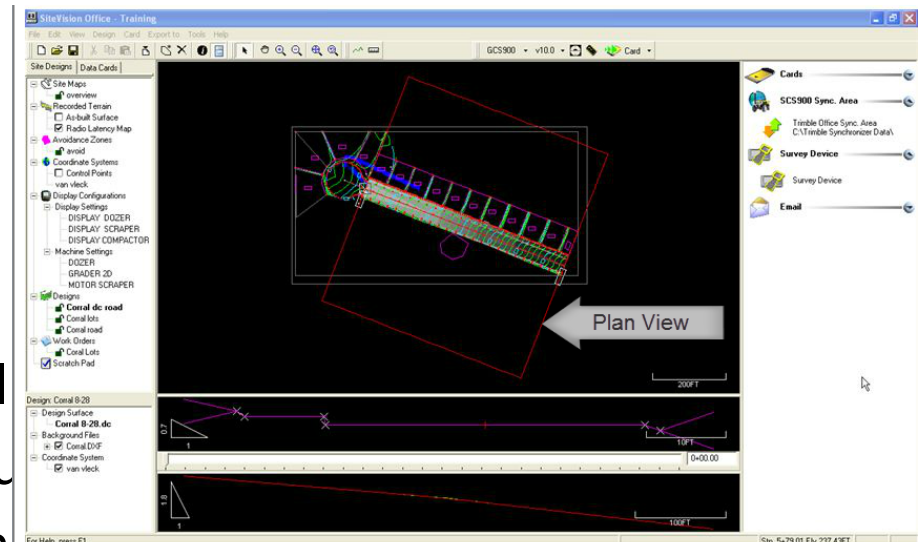
- How many tabs are there in the display settings?
- Name those four tabs?

Views

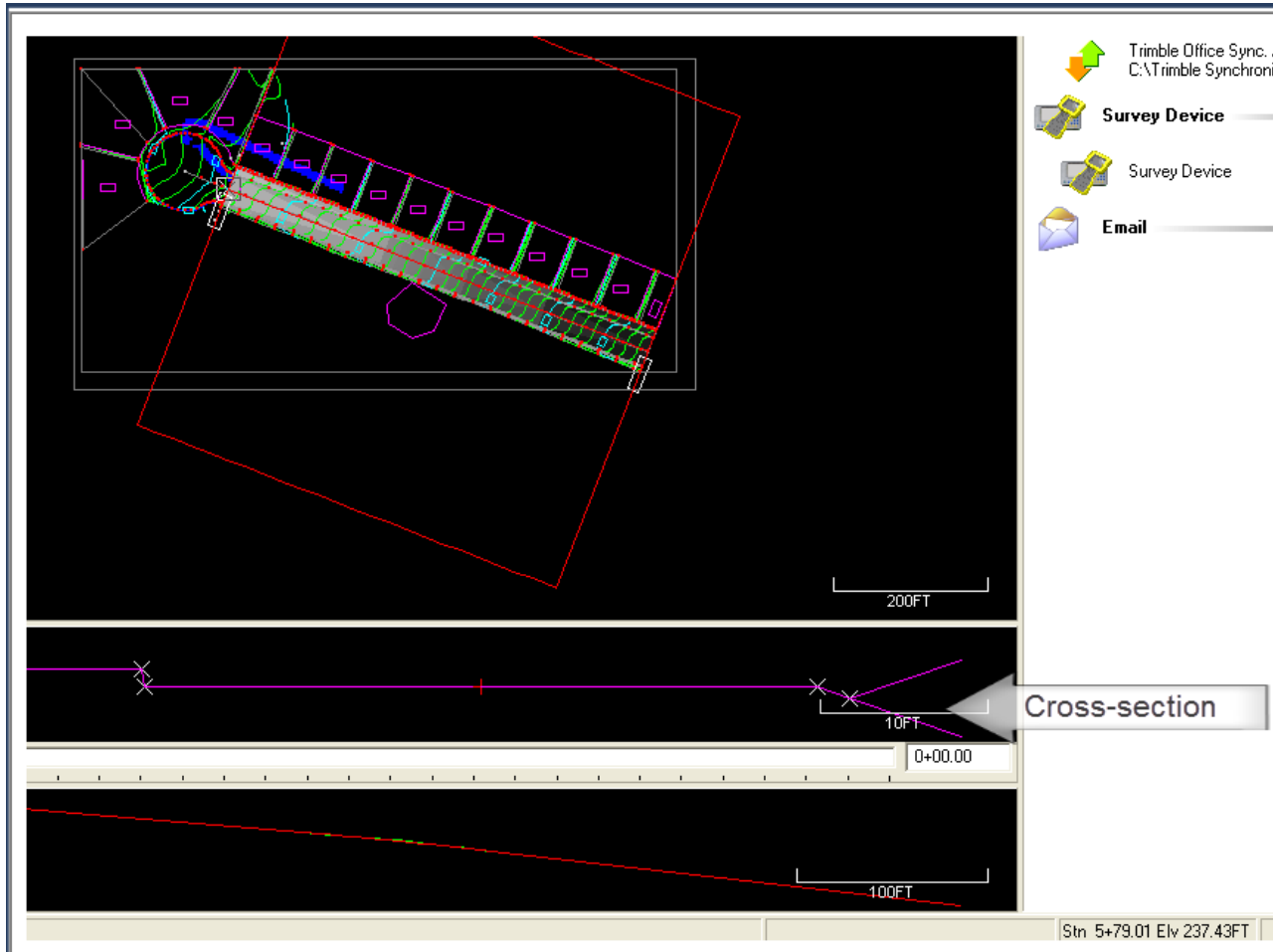
- In SVO you will have three different views to work with.
- Changes in one view it automatically updates the other views.
- Allows you to check the design data.
 - Plan View
 - Cross Section View
 - Profile View

Plan View

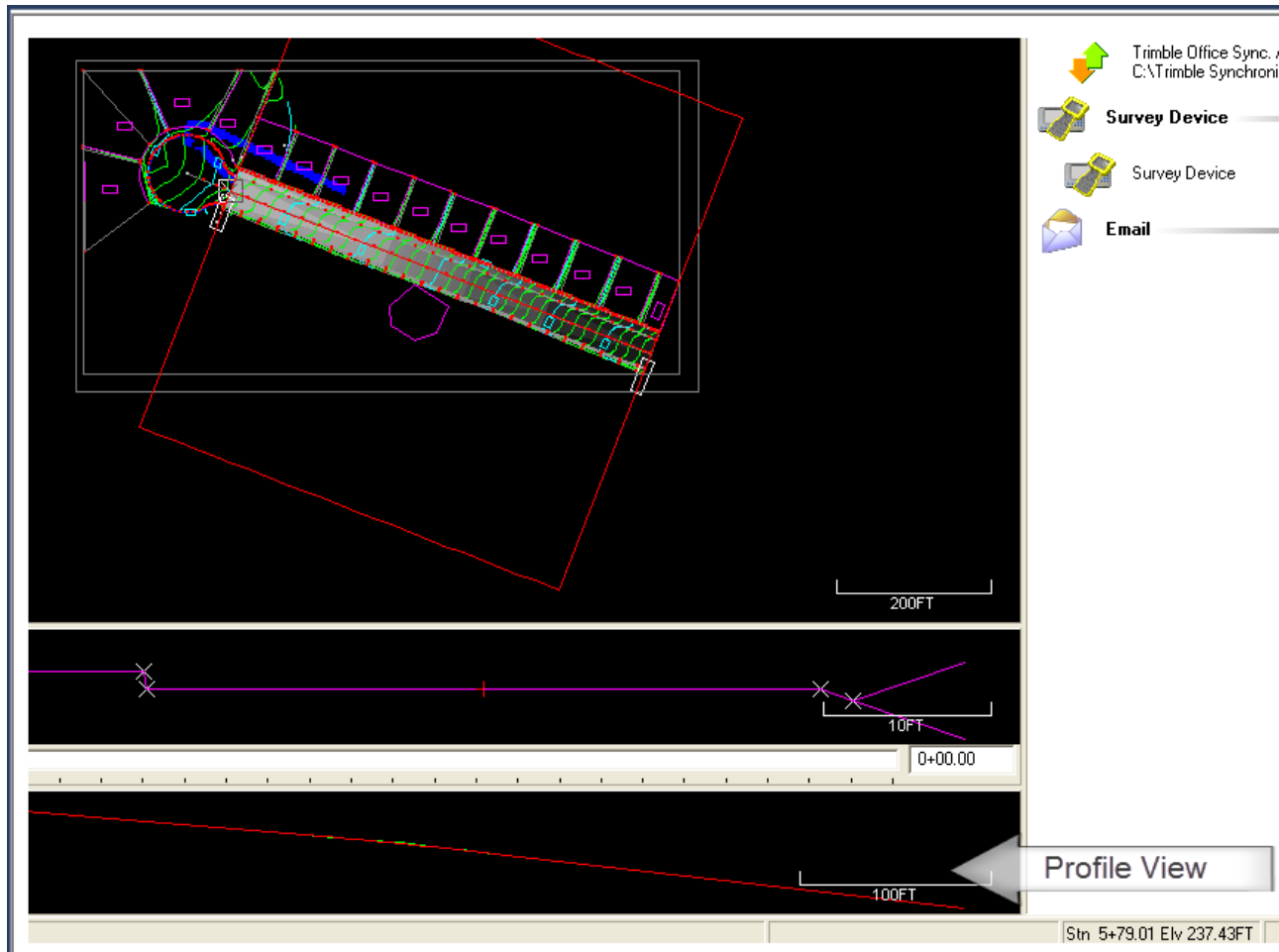
- “Birds-Eye” view. Graphically displays:
 - Surface
 - Recorded Terrain
 - Road
 - Control Points
 - Background Files
- Navigate through by use of Tool
- N, E shown on the window Status
- Z shown if cursor is over design surface
- *.dc file shown used for N, E, Z



View

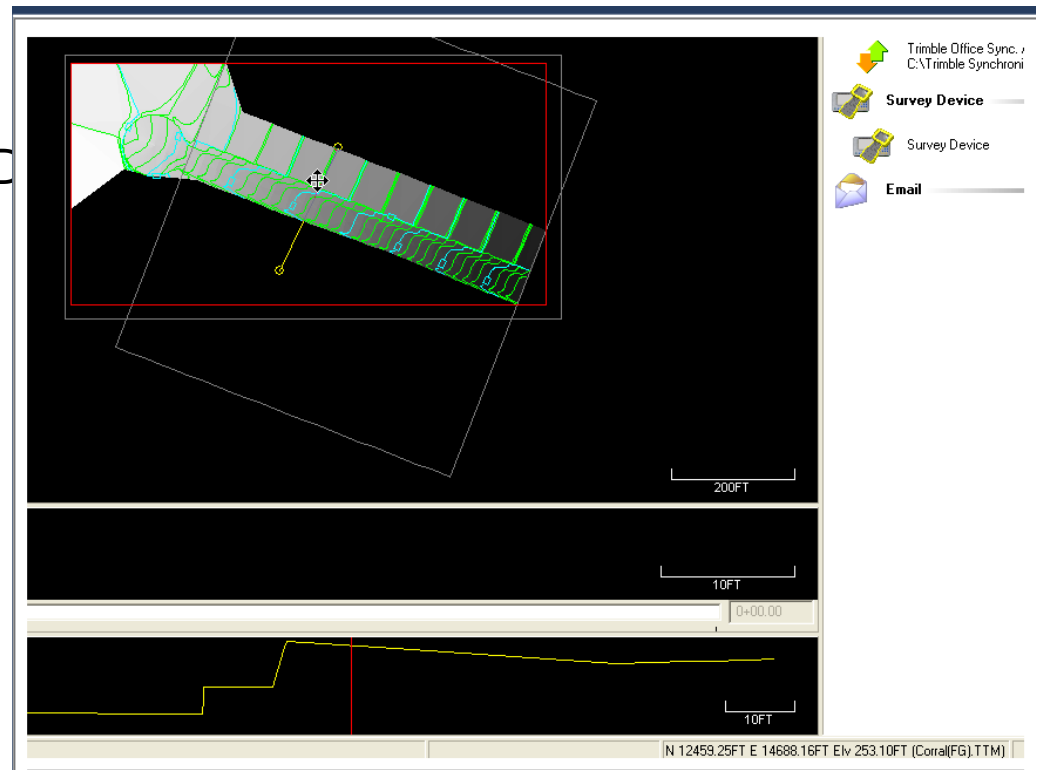


Profile View



Profile View, cont

- Can perform commands similar to TM “Quick DTM Profile”
- Verify and Check existing and design elevations
- Draw a profile:
 - Select a design in the Site D
 - Click Profile Button
 - Click, Hold, Drag, Release
 - View Profile View
 - “DYNAMIC”
 - Click, Hold, Drag
 - View Profile View



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- How many views can you work with for your particular project site?
- Name those three different views?

10 Min

BREAK

Import Data

- Linework
- Surface data
- Roading data
- Coordinate systems
- Machine display settings (Heavy Equipment)
- Machine settings (Heavy Equipment)

Export Data

- Trimble GCS900 Grade Control System
 - Heavy Equipment 3D Machine Control
 - 120M Motorgrader
 - 850JR MCT Dozer
 - Compactor
 - 621B Scraper
- Trimble Survey Controller
 - B2120 Survey Set, GP
 - TSC2
 - TCU
- Trimble SCS900 Site Controller

DEMONSTRATION

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- What can you export the design data to?
- Who is responsible for loading the card into the H.E.?

10 Min

BREAK

Establish Communication

- Ensure that the HE operator knows how to set up and start their GPS equipment.
- Ensure that you give HE the correct coordinates/coordinate system from the design data.
- HE is responsible for their Base and



Calibration

- Is the responsibility of the HE operator
- Ensures that their blade is properly calibrated to the GCS900 that is installed on the equipment
- Is often forgotten and will cause the blade to dig in the wrong location

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- Whose responsibility is it to provide the correct coordinates on the base station for the vertical and horizontal control of a particular horizontal construction mission?
- Who is responsible in conducting Blade Calibration on a particular Trimble 3D Machine Control GCS900 enabled heavy equipment?

TRIMBLE TUTORIAL

TRIMBLE KNOWLEDGE NETWORK, WEB BASED

http://www.trimblelms.com/tr_open_main_courses.asp

10 Min

BREAK

Practical Application

- Establish Control
- Conduct Radial Survey
- Download and Edit Field Data
- Design Horizontal Project
- Create New Site in SVO
- Import Design Data into SVO
- Export Data
- Verify Export Files H.E. needs for the GCS900

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- How many file types are needed for heavy equipment 3D Machine Control to work?
- What are the minimum file type extensions needed for heavy equipment 3D Machine Control to work?

Summary

- SiteVision Office
 - Uses
 - Who
 - What
 - Site Design Tab
 - Create a New Site
 - Display Options
 - Views
 - Import and Export Data
 - Establish Communication between the base and rovers
 - Blade Calibration.